



Keeping the Lights on in Rural Minnesota

Full Mitigation Best Practice Story

Multiple Counties, Minnesota

The State of Minnesota - Minnesota is known for its inclement weather. But even long-time residents were taken aback by the ferocity of such an early winter storm when it began Halloween night of 1991. First rain drenched southern Minnesota. Then the temperature dropped and it changed to ice and snow. The combination of 50-80 mph winds and precipitation with temperatures ranging from 20-30 degrees Fahrenheit, created hazardous and damaging ice conditions.



"The winds were so strong the ice froze perpendicular," said Dave Lundberg, Finance Division Manager for Steele-Waseca Cooperative Electric, Owatonna, Minnesota. "We experienced \$3 million in [damage] and people were without power for a week. Once temporary repairs were made, a 5-year replacement plan began."

The loss of power to farmers and rural residents can be disastrous in regards to both economics and safety. Steele-Waseca Cooperative Electric (SWCE) provides electrical power to over 7800 rural customers with 1920 miles of line, covering an area of 900 square miles in nine surrounding counties in Southeast and South-central Minnesota. SWCE, like all Minnesota rural electric co-ops, is owned by its membership: the rural customers the utility serves with electrical power.

"The rural areas are more susceptible to power outages than suburban and urban areas," said Mark Glaess, manager, Minnesota Rural Electric Association (MREA). "Animal husbandry is dependent on electricity, especially for ventilation. Without proper ventilation, the animals can die and a farmer can lose his whole operation. Also, the rural population is more aged than urban and suburban areas and are more dependent on electricity for medical purposes."

Rural cooperatives operate over a much larger distance than municipal power companies, and with far less revenue per mile of line. Because the cooperatives average only six customers per mile of line (SWCE averages four per mile) as compared to an average of 40 per mile for municipal utilities, costly repairs can mean much higher rates for rural residents, who statistically earn less than the state's average per capita income.

"When we get knocked down by a storm, there's more line down with more to repair, and it's a huge financial hit," said Glaess. "Investing the mitigation money into the system to mitigate future calamities is incredibly important to the welfare of rural residents."

The 1991 Halloween storm damaged several miles of SWCE power lines. With the cooperation of MREA and its co-ops, 125 line workers drove 60 additional utility trucks to the area from all parts of the state to help repair the lines. Farmers aided line workers by clearing snow to the power lines and towing utility trucks out of snowdrifts.

The damage was so extensive, however, some residents could not switch their lights on for a week. As repairs took place, SWCE began developing a plan to improve the lines so weather damage in the future would not evoke so extensive a toll on the utility's resources.

The Minnesota Division of Emergency Management (DEM) coordinated FEMA mitigation funding for the SWCE utility projects. The mitigation projects met one of the core values of the DEM: to create a sustainable community that is resistant to the human and economic cost of disasters. FEMA's Hazard Mitigation Grant Program (HMGP) is a cost share program activated by federally declared disasters.

The first mitigation project entailed replacing 8.5 miles of three-phase 6 ACWC conductor with T-2 line, using shorter spans between utility poles, heavier poles and cross-arm bracing and 4.0 miles of underground cable. (Project cost: \$645,674. Approved July 1995.)

In the spring of 1997, a similar project to retrofit 8.25 miles was implemented. (Project cost: \$192,400. Approved June 1997.)

After a storm in 1998 severely damaged power lines serving Bridgewater, Forest and Webster Townships, SWCE applied for HMGP funds to rebuild three miles of power line using new underground wiring technology. (Project cost: \$167,500. Approved

October 1999.)

"What was learned in the previous disaster was applied to the next one. With the knowledge we obtained each time a mitigation project was completed, we were able to help other co-ops with our lessons learned," said Dave Lundberg.

"The use of T-2 conductor specifications, shorter spans, and heavier poles and crossarms have been calculated by our engineering firm to increase the overall strength of the distribution line by 66%," said Dave Lundberg. The strengthening of the lines from implementing these measures has been so successful that they have become standard procedure in constructing power lines and repairing older lines.

In May of 1996 high winds and tornadoes blew through the SWCE service area. "Previously installed T-2 and other new lines remained standing and clearly showed that the money spent on mitigation projects was successful," said Lundberg.

In ongoing FEMA mitigation funding and repair work since the 1991 storm, \$2.2 million has been spent on infrastructure projects and \$611,231 spent in HMGP grant funds.

"Without FEMA, we would have financed the majority of the storm rebuilding with a loan from the Rural Utilities Service (RUS), to be repaid over 35 years with interest. The only way we have to recover the principal and interest cost is through our consumers' retail electric rates. FEMA has helped us hold down the price of our retail rate. The FEMA grants will save our rural electric consumers \$3.9 million in future interest costs. The future value of the grant and interest savings are in excess of \$15 million. If these lines weren't fixed and rebuilt, electric service quality and reliability would not be there. With a better, more reliable electric service, a better quality of life is achieved through avoided outages," said Dave Lundberg.

Activity/Project Location

Geographical Area: **Multiple Counties in a State**

FEMA Region: **Region V**

State: **Minnesota**

County: **Steele County; Waseca County**

Key Activity/Project Information

Sector: **Private**

Hazard Type: **Winter Storm**

Activity/Project Type: **Utility Protective Measures**

Activity/Project Start Date: **01/1992**

Activity/Project End Date: **Ongoing**

Funding Source: **Local Sources**

Activity/Project Economic Analysis

Cost: **Amount Not Available**

Activity/Project Disaster Information

Mitigation Resulted From Federal Disaster? **Yes**

Federal Disaster #: **929 , 12/26/1991**

Federal Disaster Year: **1991**

Value Tested By Disaster? **Yes**

Tested By Federal Disaster #: **No Federal Disaster specified**

Year First Tested: **1996**

Repetitive Loss Property? **Unknown**

Reference URLs

Reference URL 1: <http://www.fema.gov/business/guide/section3f.shtm>

Reference URL 2: <http://www.hsem.state.mn.us/>

Main Points

- Long-time residents were taken aback by the ferocity of such an early winter storm when it began Halloween night of 1991. First rain drenched southern Minnesota. Then the temperature dropped and it changed to ice and snow.
- The loss of power to farmers and rural residents can be disastrous in regards to both economics and safety.
- As repairs took place, SWCE began developing a plan to improve the lines so weather damage in the future would not evoke so extensive a toll on the utility's resources.
- In ongoing FEMA mitigation funding and repair work since the 1991 storm, \$2.2 million has been spent on infrastructure projects and \$611,231 spent in HMGP grant funds.



A severe winter storm struck rural Minnesota, causing damage to power lines



Recovery was a collective effort - farmers helped utility workers by clearing snow